

S/N 09/945535



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Kie Y. Ahn et al.	Examiner:	David S. Blum
Serial No.:	09/945535	Group Art Unit:	2813
Filed:	August 30, 2001	Docket:	1303.026US1
Title:	HIGHLY RELIABLE AMORPHOUS HIGH-K GATE OXIDE ZrO ₂		

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the enclosed materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicants respectfully request that this Supplemental Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicants request that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicants with the next official communication.

Pursuant to 37 C.F.R. §1.97(c)(2), Applicants have included the fee of \$180.00 as set forth in 37 C.F.R. §1.17(p). Please charge any additional fees or credit any overpayment to Deposit Account No. 19-0743.

RECEIVED
OCT - 7 2003
TECHNOLOGY CENTER 2800

The Examiner is invited to contact the Applicants' Representative at the below-listed telephone number if there are any questions regarding this communication.


Respectfully submitted,

KIE Y. AHN ET AL.

By their Representatives,

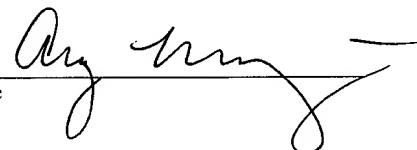
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 373-6944

Date 10-1-03

By 
David C. Peterson
Reg. No. 47,857

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 1st day of October, 2003.

Name Amy Moriarty

Signature 

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Complete if Known

Application Number	09/945535
Filing Date	August 30, 2001
First Named Inventor	Ahn, Kie
Group Art Unit	2813
Examiner Name	Blum, David

Sheet 1 of 8

Attorney Docket No: 1303.026US1

US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document	Class	Subclass	Filing Date If Appropriate
	US20010051442A1	12/13/2001	Katsir, D., et al.	438	758	06/28/2001
	US20010053082A1	12/20/2001	Chipalkatti, M. H., et al.	362	496	12/22/1999
	US20020022156A1	02/21/2002	Bright, C. I.	428	698	08/24/2001
	US20020119297	08/29/2002	Forrest, S. R., et al.	428	199	12/21/2001
	US20030001241A1	01/02/2003	Chakrabarti, U. K., et al.	257	643	05/28/2002
	US-3,381,114	04/30/1968	Nakanuma, Sho	219	385	12/18/1964
	US-4,394,673	07/19/1983	Thompson, R. D., et al.	357	15	09/29/1980
	US-4,413,022	11/01/1983	Suntola, T., et al.	427	255.2	06/21/1979
	US-4,590,042	05/20/1986	Drage, David J.	422	186.06	12/24/1984
	US-4,767,641	08/30/1988	Kieser, Jorg, et al.	427	38	07/03/1986
	US-4,993,358	02/19/1991	Mahawili, Imad	118	715	07/28/1989
	US-5,006,192	04/09/1991	Deguchi, Mikio	156	345	11/21/1988
	US-5,055,319	10/08/1991	Bunshah, R. F., et al.	427	38	04/02/1990
	US-5,080,928	01/14/1992	Klinedinst, K. A., et al.	427	70	10/05/1990
	US-5,198,029	03/30/1993	Dutta, A., et al.	118	303	02/19/1992
	US-5,595,606	01/21/1997	Fujikawa, Y., et al.	118	725	04/18/1996
	US-5,621,681	04/15/1997	Moon, J	365	145	03/22/1996
	US-5,698,022	12/16/1997	Glassman, T. E., et al.			08/14/1996
	US-5,735,960	04/07/1998	Sandhu, Gurtej S., et al.	118	723 IR	04/02/1996
	US-5,744,374	04/28/1998	Moon, Jong	437	60	11/18/1996
	US-5,840,897	11/24/1998	Kirlin, Peter, et al.	546	2	06/07/1995
	US-5,916,365	01/29/1999	Sherman, A.	117	92	08/16/1996
	US-5,950,925	09/14/1999	Fukunaga, Yukio, et al.	239	132.3	10/10/1997
	US-5,972,847	10/26/1999	Feenstra, R., et al.	505	473	01/28/1998
	US-6,057,271	05/02/2000	Kenjiro, H., et al.	505	475	06/07/1995
	US-6,059,885	05/09/2000	Ohashi, Tadashi, et al.	118	730	12/16/1997
	US-6,110,529	08/29/2000	Gardiner, R., et al.	427	250	06/07/1995
	US-6,161,500	12/19/2000	Kopacz, Stanislaw, et al.	118	723 E	09/30/1997
	US-6,203,613	03/20/2001	Gates, S., et al.	117	104	10/19/1999
	US-6,206,972	03/27/2001	Dunham, Scott W.	118	715	07/08/1999
	US-6,232,847	05/15/2001	Marcy, 5th, H. O., et al.	331	167	05/28/1998
	US-6,281,144	08/28/2001	Cleary, Thomas J., et al.	438	780	07/15/1999
	US-6,291,866	09/18/2001	Wallace, R. M., et al.	257	410	10/20/1999
	US-6,297,516	10/02/2001	Forrest, S. R., et al.	257	40	06/25/1999
	US-6,302,964	10/16/2001	Umotoy, Salvador P., et al.	118	715	03/16/2000
	US-6,348,386	02/19/2002	Gilmer, D C.	438	288	04/16/2001
	US-6,380,579	04/30/2002	Nam, S., et al.	257	306	04/11/2000
	US-6,391,769	05/21/2002	Lee, J., et al.	438	643	03/14/2000
	US-6,420,279	07/16/2002	Ono, Yoshi, et al.	438	785	06/28/2001
	US-6,432,779	08/13/2002	Hobbs, C., et al.	438	287	01/30/2001

EXAMINER

DATE CONSIDERED

Substitute Disclosure Statement Form (PTO-1449)

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

OCT 03 2003

PAT-1449A

Sheet 2 of 8

Complete if Known

Application Number	09/945535
Filing Date	August 30, 2001
First Named Inventor	Ahn, Kie
Group Art Unit	2813
Examiner Name	Blum, David

Attorney Docket No: 1303.026US1

RECEIVED
OCT - 7 2003
TECHNOLOGY CENTER 2800

	US-6,444,039	09/03/2002	Nguyen, Tue	118	715	03/07/2000
	US-6,444,895	09/03/2002	Nikawa, K.	136	212	09/24/1999
	US-6,445,023	09/03/2002	Vaartstra, Brian , et al.	257	295	03/16/1999
	US-6,448,192	09/10/2002	Kaushik, Vidya S.	438	785	04/16/2001
	US-6,458,701	10/01/2002	Chae, Y. , et al.	438	680	10/12/2000
	US-6,482,740	11/19/2002	Soininen, Pekka J., et al.	438	686	05/15/2001
	US-6,514,828	02/04/2003	Ahn, Kie Y., et al.	438	297	04/20/2001
	US-6,534,420	03/18/2003	Ahn, Kie Y., et al.	438	768	07/18/2001

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Foreign Document No	Publication Date	Name of Patentee or Applicant of cited Document	Class	Subclass	T ²
	JP-5090169	04/09/1993	Watanabe, Kunihiko , et al.			
	JP-62-199019	09/02/1987	Takaaki, Sasaki			

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		AARIK, J , et al., <u>Thin Solid Films</u> , 340, (1999),110-116	
		AARIK, JAAN , et al., "Atomic layer growth of epitaxial TiO/sub 2/ thin films from TiCl/sub 4/ and H/sub 2/O on alpha -Al/sub 2/O/sub 3/ substrates", <u>Journal of Crystal Growth</u> , vol.242, no.1-2, (2002),189-198	
		AARIK, JAAN , et al., "Phase transformations in hafnium dioxide thin films grown by atomic layer doposition at high temperatures", <u>Applied Surface Science</u> , 173, (2001),15-21	
		AARIK, JAAN , et al., "Texture Development in nanocrystalline hafnium dioxide thin films grown by atomic layer deposition", <u>Journal of Crystal Growth</u> , 220, (2000),105-113	
		ALLEN, PETRA , et al., "Atomic Layer deposition of Ta(Al)N(C) thin films using trimethylaluminum as a reducing agent", <u>Journal of the Electrochemical Society</u> , vol.148, no.10, (October 2001),G566-G571	
		BENDORAITIS, J G., et al., <u>Jour. Phys. Chem.</u> , 69(10), (1965),3666-3667	
		BUNSHAH, ROINTAN F., et al., "Deposition Technologies for Films and Coatings: Developments and Applications", Noyes Publications,102-103	
		CAVA, R J., et al., "Improvement of the dielectric properties of Ta/sub 2/O/sub 5/ through substitution with Al/sub 2/O/sub 3/", <u>Applied Physics Letters</u> , vol.70, no.11, (March 1997),1396-8	
		COPEL, M. , et al., "Structure and stability of ultrathin zirconium oxide layers on Si(001)", <u>Applied Physics Letters</u> , Vol 76, No. 4, (January 2000),436-438	
		DE FLAVIIS, FRANCO , et al., "Planar microwave integrated phase-shifter design with high purity ferroelectric material", <u>IEEE Transactions on Microwave Theory & Techniques</u> , vol.45, no.6, (June 1997),963-969	
		DESU, S.B. , "Minimization of Fatigue in Ferroelectric Films", <u>Phys. Stat. Sol. (a)</u> 151, (1995),467-480	

EXAMINER

DATE CONSIDERED

Substitute Disclosure Statement Form (PTO-1449)

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

OCT 03 2003

Complete if Known

Application Number	09/945535
Filing Date	August 30, 2001
First Named Inventor	Ahn, Kie
Group Art Unit	2813
Examiner Name	Blum, David

RECEIVED
OCT 17 2003
TECHNOLOGY CENTER 2809

Sheet 3 of 8

Attorney Docket No: 1303.026US1

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		DUSCO, C , et al., "Deposition of tin oxide into porous silicon by atomic layer epitaxy", <u>J. Electrochem. Soc.</u> , 143, (1996),683-687	
		EL-KAREH, B , et al., "The evolution of DRAM cell technology", <u>Solid State Technology</u> , (1997),89	
		ENGELHARDT, M. , "Modern Applications of Plasma Etching and Patterning in Silicon Process Technology", <u>Contrib. Plasma. Phys.</u> , 39(5), (1999),473-478	
		FORSGREN, K , <u>Comprehensive Summaries of Uppsala Dissertation from the Faculty of Science and Technology</u> , 665, (2001),37	
		FORSGREN, KATARINA , et al., "Atomic Layer Deposition of HfO2 using hafnium iodide", <u>Conference held in Monterey, California, (May 2001)</u> ,1 page	
		FUYUKI, TAKASHI , et al., "Electronic Properties of the Interface between Si and TiO2 Deposited at Very Low Temperatures", <u>Journal of Applied Physics</u> , (1986),1288-1291	
		GARTNER, M , et al., "Spectroellipsometric characterization of lanthanide-doped TiO2 films obtained via the sol-gel technique", <u>Thin Solid Films</u> , (1993),561-565	
		GELLER, S. , et al., "Crystallographic Studies of Perovskite-like Compounds. II. Rare Earth Aluminates", <u>Acta Cryst. Vol. 9</u> , (May 1956),1019-1025	
		GIESS, E. A., et al., "Lanthanide gallate perovskite-type substrates for epitaxial, high-Tc superconducting Ba2YCu3O7- films", <u>IBM J. Res. Develop. vol. 34, No. 6</u> , (November 1990),916-926	
		GUILLAMOT, B , et al., <u>Technical Digest of International Electron Devices Meeting 2002</u> , (2002),355-358	
		GUSEV, E P., et al., "Ultrathin High-K Dielectrics Grown by Atomic Layer Deposition: A Comparative Study of ZrO2, HfO2, Y2O3 and Al2O3", <u>Electrochemical Society Proceedings Volume 2001-9</u> , (2001),189-195	
		GUTOWSKI, M J., <u>J. Appl. Phys.</u> , 80, (2002),1897-1899	
		HUNT, C. E., et al., "Direct bonding of micromachined silicon wafers for laser diode heat exchanger applications", <u>J. Micromech. Microeng.</u> , 1, (1991),152-156	
		IDDLIS, D M., et al., "Relationships between dopants, microstructure and the microwave dielectric properties of ZrO2-TiO2-SnO2 ceramics", <u>Journal of Materials Science</u> , Vol. 27, (1992),6303-6310	
		JEON, SANGHUN , et al., "Excellent Electrical Characteristics of Lanthanide (Pr, Nd, Sm, Gd, and Dy) Oxide and Lanthanide-doped Oxide for MOS Gate Dielectric Applications", <u>Technical Digest of IEDM</u> , (2001),471-474	
		JUNG, H S., et al., <u>Technical Digest of International Electron Devices Meeting 2002</u> , (2002),853-856	
		KANG, L , et al., <u>Tech. Dig. Int. Electron Devices Meet.</u> , 2000, (2000),35	
		KEOMANY, D. , et al., "Sol gel preparation of mixed cerium-titanium oxide thin films", <u>Sol. Energy Mater. So. Cells</u> , 33,(1994),pp. 429-441	
		KIM, Y W., et al., <u>Technical Digest of International Electron Devices Meeting 2002</u> , (2002),69-72	

EXAMINER

DATE CONSIDERED

Substitute Disclosure Statement Form (PTO-1449)

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

OCT 03 2003

Complete if Known

Application Number	09/945535
Filing Date	August 30, 2001
First Named Inventor	Ahn, Kie
Group Art Unit	2813
Examiner Name	Blum, David

RECEIVED
OCT 17 2003
TECHNOLOGY CENTER

Sheet 4 of 8

Attorney Docket No: 1303.026US1

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		KIM, D. , et al., "Atomic Control of Substrate Termination and Heteroepitaxial Growth of SrTiO ₃ /LaAlO ₃ Films", <u>Journal of the Korean Physical Society Vol. 36 No.6, (06/2000),444-448</u>	
		KIM, BYOUNG-YOUP , et al., "Comparison study for TiN films deposited from different method: chemical vapor deposition and atomic layer deposition", <u>Mechanisms of Surface and Microstructure Evolution in Deposited Films and Film Structures Symposium (Materials Research Society Symposium Proceedings Vol.672), (2001),7.8.1-7.8.6</u>	
		KIM, TAESOK , et al., "Correlation between strain and dielectric properties in ZrTiO/sub 4/ thin films", <u>Applied Physics Letters, vol.76, no.21, (May 2000),3043-3045</u>	
		KIM, TAESOK , et al., "Dielectric properties and strain analysis in paraelectric ZrTiO/sub 4/ thin films deposited by DC magnetron sputtering", <u>Japanese Journal of Applied Physics Part 1-Regular Papers Short Notes & Review Papers, vol.39, no.7A, (2000),4153-4157</u>	
		KIM, YONGJO , et al., "Effect of microstructures on the microwave dielectric properties of ZrTiO/sub 4/ thin films", <u>Applied Physics Letters, vol.78, no.16, (April 2001),2363-2365</u>	
		KRAUTER, G. , et al., "Room Temperature Silicon Wafer Bonding with Ultra-Thin Polymer Films", <u>Advanced Materials, 9(5), (1997),417-420</u>	
		KUKLI, K J., et al., <u>J. Appl. Phys., 80, (2002),5698-5703</u>	
		KUKLI, K , et al., <u>Thin Solid Films, 416, (2002),72-79</u>	
		KUKLI, KAUPON , et al., "Atomic Layer Deposition of Titanium Oxide TiO ₂ and H ₂ O ₂ ", <u>Chem. Vap. Deposition, Vol. 6, No. 6, (2000),303-310</u>	
		KUKLI, K , et al., "Controlled Growth of Yttrium Oxysulphide Thin Films by Atomic Layer Deposition", <u>Materials Science Forum, (1999),216-221</u>	
		KUKLI, KAUPON , et al., "Dielectric Properties of Zirconium Oxide Grown by Atomic Layer Deposition from Iodide Precursor", <u>Journal of The Electrochemical Society, 148(12), (2001),F227-F232</u>	
		KUKLI, K , et al., "Influence of thickness and growth temperature on the properties of zirconium oxide films growth by atomic layer deposition on silicon", <u>Thin Solid Films, 410, (2002),53-60</u>	
		LEE, B H., et al., <u>Tech. Dig. Int. Electron Devices Meet., 2000, (2000),39</u>	
		LEE, S J., et al., <u>Tech. Dig. Int. Electron Devices Meet., 2000, (2000),31</u>	
		LEE, J H., et al., <u>Technical Digest of International Electron Devices Meeting 2002, (2002),221-224</u>	
		LEE, A E., et al., "Epitaxially grown sputtered LaAlO ₃ films", <u>Appl. Phys. Lett. 57 (19), (November 1990),2019-2021</u>	
		LEE, CHENG-CHUNG , et al., "Ion-assisted deposition of silver thin films", <u>Thin Solid Films, 359,(2000),pp. 95-97</u>	

EXAMINER

DATE CONSIDERED

Substitute Disclosure Statement Form (PTO-1449)

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Complete if Known

Application Number	09/945535
Filing Date	August 30, 2001
First Named Inventor	Ahn, Kie
Group Art Unit	2813
Examiner Name	Blum, David

Sheet 5 of 8

Attorney Docket No: 1303.026US1

	LEE, DONG H., et al., "Metalorganic chemical vapor deposition of Tio2:n anatase thin film on Si substrate", <u>Applied Physics Letters</u> , (February 1995),pp. 815-816	
	LEE, L P., et al., "Monolithic 77 K dc SQUID magnetometer", <u>Appl. Phys. Lett.</u> 59(23), (December 1991),3051-3053	
	LEE, C. H., et al., "MOS Characteristics of Ultra Thin Rapid Thermal CVD ZrO2 and Zr Silicate Gate Dielectrics", <u>IEDM</u> , (2000),pp. 27-30	
	LEE, C H., et al., "MOS Devices with High Quality Ultra Thin CVD ZrO2 Gate Dielectrics and Self-Aligned TaN and TaN/Poly-Si Gate electrodes", <u>2001 Symposium on VLSI Technology Digest of Technical Papers</u> , (2001),137-138	
	LEE, BYOUNG H., et al., "Ultrathin Hafnium Oxide with Low Leakage and Excellent Reliability for Alternative Gate Dielectric Application", <u>Technical Digest of IEDM</u> , (1999),133-136	
	LUCOVSKY, G , et al., "Microscopic model for enhanced dielectric constants in low concentration SiO2-rich noncrystalline Zr and Hf silicate alloys", <u>Applied Physics Letters</u> , (October 2000),2912-2914	
	LUO, Z J., et al., "Ultra-thin ZrO2 (or Silicate) with High Thermal Stability for CMOS Gate Applications", <u>2001 Symposium on VLSI Technology Digest of Technical Papers</u> , (2001),135-136	
	MOLODYK, A A., et al., "Volatile Surfactant-Assisted MOCVD: Application to LaAlO3 Thin Film Growth", <u>Chem. Vap. Deposition Vol. 6, No. 3</u> , (2000),133-138	
	MOLSA, HEINI , et al., "Growth of Yttrium Oxide Thin Films from B-Diketonate Precursor", <u>Advanced Materials for Optics and Electronics</u> , (1994),389-400	
	NAKAGAWARA, OSAMU , et al., "Electrical properties of (Zr, Sn)TiO4 dielectric thin film prepared by pulsed laser deposition", <u>J. Appl. Phys.</u> , 80(1), (July 1996),388-392	
	NAKAJIMA, ANRI , et al., "Atomic-layer deposition of ZrO/sub 2/ with a Si nitride barrier layer", <u>Applied Physics Letters</u> , vol.81, no.15, (October 2002),2824-2826	
	NAKAJIMA, ANRI , et al., "NH3-annealed atomic-layer-deposited silicon nitride as a high-k gate dielectric with high reliability", <u>Applied Physics Letters</u> , (February 2002),1252-1254	
	NEUMAYER, D A., et al., "Materials characterization of ZrO2-SiO2 and HfO2-SiO2 binary oxides deposited by chemical solution deposition", <u>Journal of Applied Physics</u> , (August 2001),1801-1808	
	NIILISK, A , et al., "Atomic-scale optical monitoring of the initial growth of TiO2 thin films", <u>Int. Soc. Opt. Eng.</u> , 431, (2001),72-77	
	OATES, D E., et al., "Surface impedance measurements of YBa/sub 2/Cu/sub 3O/sub 7-x/ thin films in stripline resonators", <u>IEEE Transactions on Magnetics</u> , vol.27, no.2, pt.2, (March 1991),867-871	
	OH, C B., et al., <u>Technical Digest of International Electron Devices Meeting 2002</u> , (2002),423-426	
	PARK, J J., et al., <u>J. of the Electrochemical Soc.</u> , 149, (2002),G89-G94	

EXAMINER

DATE CONSIDERED

Substitute Disclosure Statement Form (PTO-1449)

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

OCT 03 2003

Complete if Known

Application Number	09/945535
Filing Date	August 30, 2001
First Named Inventor	Ahn, Kie
Group Art Unit	2813
Examiner Name	Blum, David

RECEIVED
OCT 17 2003
TECHNOLOGY CENTER 28006

Sheet 6 of 8

Attorney Docket No: 1303.026US1

		PARK, BYUNG-EUN , et al., "Electrical properties of LaAlO ₃ /Si and Sr _{0.8} Bi _{2.2} Ta ₂ O ₉ /LaAlO ₃ /Si structures", <u>Applied Physics Letters</u> , Vol. 79, No. 6, (August 2001),806-808	
		PERKINS, CHARLES M., et al., "Electrical and materials properties of ZrO ₂ gate dielectrics grown by atomic layer chemical vapor deposition", <u>Applied Physics Letters</u> , Vol. 78, No. 16, (April 2001),2357-2359	
		POVESHCHENKO, V P., et al., <u>Sov. J. Opt. Technol.</u> , 51, (1984),277-279	
		QI, WEN-JIE , et al., "Performance of MOSFETs with ultra thin ZrO ₂ and Zr-silicate gate dielectrics", <u>2000 Symposium on VLSI Technology, Digest of Technical Papers</u> , (2000),40-41	
		RAMAKRISHNAN, E S., et al., "Dielectric Properties of Radio Frequency Magnetron Sputter Deposited Zirconium Titanate-Based Thin Films", <u>J. Electrochem. Soc.</u> , Vol. 145, No. 1, (January 1998),358-362	
		RAYNER JR., G , et al., "The Structure of Plasma-Deposited and Annealed Pseudo-Binary ZrO ₂ -SiO ₂ Alloys", <u>Material Res. Soc. Symp.</u> , (2000),C1.3.1-C1.3.9	
		RITALA, MIKKO , "Atomic Layer Epitaxy Growth of Titanium, Zirconium and Hafnium Dioxide Thin Films", <u>Annales Academiae Scientiarum Fennicae</u> , (1994),24-25	
		RITALA, MIKKO , et al., "Zirconium dioxide thin films deposited by ALE using zirconium tetrachloride as precursor", <u>Applied Surface Science</u> , Vol. 75, (1994),333-340	
		ROBERTSON, J. , "Band offsets of wide-band-gap oxides and implications for future electronic devices", <u>Journal Vac. Sci. Technol. B</u> , 18(3), (2000),pp. 1785-1791	
		ROSSNAGEL, S M., et al., "Plasma-enhanced atomic layer deposition of Ta and Ti for Interconnect diffusion barriers", <u>J. Vac. Sci. & Technol.</u> , B, 18, (2000),2016-2020	
		ROTONDARO, A L., et al., "Advanced CMOS Transistors with a Novel HfSiON Gate Dielectric", <u>Symposium on VLSI Technology Digest of Technical Papers</u> , (2002),148-149	
		SHANWARE, A , et al., "Reliability evaluation of HfSiON gate dielectric film with 12.8 Å SiO ₂ equivalent thickness", <u>International Electron Devices Meeting</u> , (2001),137-140	
		SNEH, OFER , "Thin film atomic layer deposition equipment for semiconductor processing", <u>Thin Solid Films</u> , vol.402, no.1-2, (January 2002),248-261	
		SONG, HYUN-JUNG , et al., "Atomic Layer Deposition of Ta ₂ O ₅ Films Using Ta(OC ₂ H ₅) ₅ and NH ₃ ", <u>Mat. Res. Soc. Symp. Proc.</u> , (1999),469-471	

EXAMINER

DATE CONSIDERED

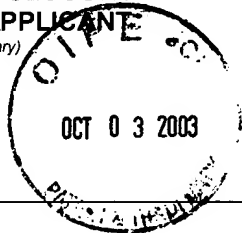
Substitute Disclosure Statement Form (PTO-1449)

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)



Complete if Known

Application Number	09/945535
Filing Date	August 30, 2001
First Named Inventor	Ahn, Kie
Group Art Unit	2813
Examiner Name	Blum, David

RECEIVED
OCT - 1 2003
TECHNOLOGY CENTER 2800

Sheet 7 of 8

Attorney Docket No: 1303.026US1

		SUNTOLA, T. , "Atomic Layer Epitaxy", Handbook of Crystal Growth, 3; Thin Films of Epitaxy, Part B: Growth Mechanics and Dynamics, Amsterdam,(1994),pp. 602-663	
		SUNTOLA, T. , "Atomic layer epitaxy", Thin Solid Films, 216, (1992),84-89	
		TAKEMOTO, J. H., et al., "Microstrip Resonators and Filters Using High-TC Superconducting Thin Films on LaAlO ₃ ", IEEE Transaction on Magnetics, Vol. 27, No. 2, (March 1991),2549-2552	
		TARRE, A , et al., "Comparative study of low-temperature chloride atomic-layer chemical vapor deposition of TiO ₂ and SnO ₂ ", Applied Surface Science, (2001),111-116	
		TAVEL, B , et al., Technical Digest of International Electron Devices Meetings 2002, (2002),429-432	
		VAN DOVER, R. B., et al., "Amorphous lanthanide-doped TiO _x dielectric films", Applied Physics Letters, Vol. 74, No. 20,(May 17, 1999),pp. 3041-3043	
		VAN DOVER, ROBERT B., et al., "Deposition of Uniform Zr-Sn-Ti-O films by ON-Axis Reactive Sputtering", IEEE Electron Device Letters, Vol. 19, No. 9, (September 1998),329-331	
		VAN DOVER, R. B., et al., "Discovery of a useful thin-film dielectric using a composition-spread approach", Letters to Nature, (1997),3 pages	
		VIROLA, H , et al., "Controlled growth of antimony-doped tin dioxide thin films by atomic layer epitaxy", Thin Solid Films, (1994),127-135	
		VIROLA, H , "Controlled growth of tin oxide thin films by atomic layer epitaxy", Thin Solid Films, (1994),144-149	
		VISOKAY, M R., et al., "Application of HfSiON as a gate dielectric material", Applied Physics Letters, (April 2002),3183-3185	
		VON DOVER, R B., et al., "Deposition of Uniform Zr-Sn-Ti-O Films by On-Axis Reactive Sputtering", IEEE Electron Device Letters, 19, (1998),1998	
		WILK, G D., et al., "Hafnium and zirconium silicates for advanced gate dielectrics", Journal of Applied Physics, (January 2000),484-492	
		WILK, G. D., et al., "High-K gate dielectrics: Current status and materials properties considerations", J. Appl. Phys., vol. 89, No. 10, (May 2001),5243-5275	
		WOLFMAN, G , et al., "Existence range, structural and dielectric properties of ZrxTiySnzO4 ceramics (x + y =2)", Mat. Res. Bull., 16, (1981),1455	
		YAMAGUCHI, TAKESHI , et al., "Band Diagram and Carrier Conduction Mechanism in ZrO ₂ /Zr-silicate/Si MIS Structure Fabricated by Pulsed-laser-ablation Deposition", IEDM, (2000),19-22	
		YAMAGUCHI, TAKESHI , et al., "Study on Zr-Silicate Interfacial Layer of ZrO ₂ -MIS Structure FABricated by Pulsed Laser Ablation Deposition Method", Solid State Devices and Materials, (2000),228-229	

EXAMINER

DATE CONSIDERED

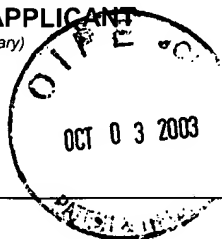
Substitute Disclosure Statement Form (PTO-1449)

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)



Complete if Known

Application Number	09/945535
Filing Date	August 30, 2001
First Named Inventor	Ahn, Kie
Group Art Unit	2813
Examiner Name	Blum, David

Sheet 8 of 8

Attorney Docket No: 1303.026US1

		ZHANG, H. , "Atomic Layer Deposition of High Dielectric Constant Nanolaminates", <u>Journal of The Electrochemical Society</u> , 148(4),(April, 2001),F63-F66	
		ZHANG, H , et al., "High permittivity thin film nanolaminates", <u>Journal of Applied Physics</u> , Vol. 87, No. 4, (February 2000),1921-1924	
		ZHU, W , et al., "HfO2 and HfAlO for CMOS: Thermal Stability and Current Tranport", <u>IEEE International Electron Device Meeting 2001</u> , (2001),463-466	
		ZUCKER, O , et al., "Application of Oxygen Plasma Processing to Silicon Direct Bonding", <u>Sensors and Actuators A</u> , 36, (1993),227-231	

RECEIVED
OCT - 7 2003
TECHNOLOGY CENTER 2800

EXAMINER

DATE CONSIDERED